SIDE-POWER
Thruster Systems

SH 1000/513 TC
SH 1400/610 TC

Keep this manual onboard !

EN Installation and user's manual

N Installasjon og brukermanual

Mechanical thruster installation only

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CE

Made in Norway

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DECLARATION OF CONFORMITY

CE

We, Sleipner Motor AS
P.O. Box 519
N-1612 Fredrikstad, Norway

declare that this product with accompanying standard remote control systems complies with the essential health and safety requirements according to the Directive 89/336/EEC of 23 May 1989 amended by 92/31/EEC and 93/68/EEC.

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SAMSVARSERKLÆRING

CE

Vi , Sleipner Motor AS
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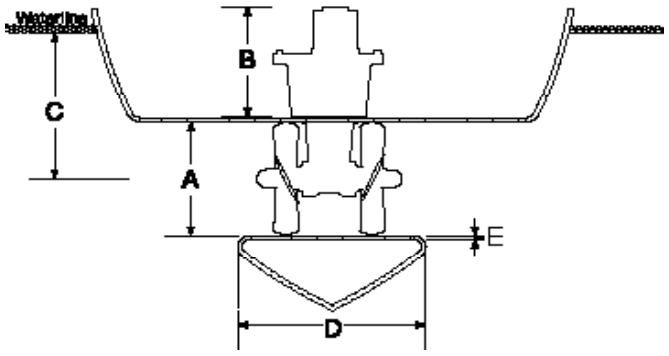
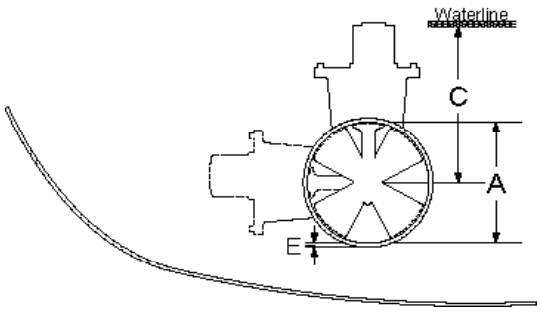
erklærer at dette produktet med tilhørende standard kontrollsystemer er i samsvar med helse, og sikkerhetskravene i henhold til Direktiv 89/336/EEC fra 23 Mai 1989, korrigert av 92/31/EEC og 93/68/EEC.





METRIC

	SH1000	SH1400
Light duty thrust [kg]	1200	1600
Heavy duty thrust [kg]	1000	1400
A [mm]	513	610
B [mm]	486	500
C min. [mm]	700	830
D [mm]	750	750
D recommended [mm]	900	900
E recommended [mm]	16	18
E min/max. [mm]	12/22	14/24
Hydraulic power [kW]	62	82
Gear oil capacity [ml]	4500	4500

Note: *E recommended.:* *wall thickness of a standard Sidepower tunnel*
E min/max: *minimum/maximum wall thickness when using other GRP, steel or aluminium tunnels*

IMPERIAL

	SH1000	SH1400
Light duty thrust [lbs]	2646	3527
Heavy duty thrust [lbs]	2205	3086
A [in]	20.2	24
B [in]	19.1	19.7
C min. [in]	27.6	32.7
D [in]	29.5	29.5
D recommended [in]	35.4	35.4
E recommended [in]	0.63	0.71
E min/max. [in]	0.47/0.87	0.55/0.94
Hydraulic power [Hp]	83	110
Gear oil capacity [fl.oz]	152.2	152.2

Note: *Emin.:* *wall thickness of a standard Sidepower tunnel*
Emax.: *maximum wall thickness when using other GRP, steel or aluminium tunnels*

EN Technical specifications

Motor: Hydraulic type (specifications next page)

Gear house: Seawater resistant bronze
Gears: Hardened precision gears
Lubrication: Oil bath from tank (gear oil GL-5)
Bearings: Angular contact ball bearing at propellershaft and combination of ball bearing and needle bearing at driveshaft.
Material: Seawater resistant bronze, protected with anodes

Motor bracket: Seawater resistant aluminium

Tunnel: Cross spun with rowing G.R.P tunnel
Steel & aluminum tunnels available at request.

Propellers: Symmetrical Bronze 5-blade skew "Q-PROP"

Control panel: Not supplied as standard

Safety: Flexible coupling between hydraulic motor and driveshaft protects gearsystem against peak loads.

N Tekniske data

Motor: Hydraulisk type (spesifikasjoner neste side).

Girhus: Sjøvannsbestandig bronsje.
Tannhjul: Herdede presisjonstannhjul
Smøring: Oljebad fra tank (GL-5 girolje)
Lager: Vinklede kulelager på propellaksel og kombinasjon av kulelager og nålelager på drivaksel
Material: Sjøvannsbestandig bronse, med anodebeskyttelse

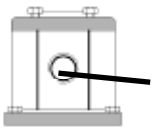
Motorbrakett: Sjøvannsbestandig aluminium.

Tunnel: Kryssvevet glassfiber.
Aluminium og ståltunnel på forespørsel.

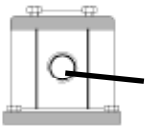
Propell: Symmetrisk 5-blads skewback "Q-prop" propell i sjøvannsbestandig bronsje

Kontrollpanel: Ikke inkludert som standard

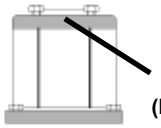
Sikkerhet: Fleksibel kobling mellom hydraulisk motor og girhus beskytter drivsystemet mot overbelastning



Port A



Port B



Drain port
(Must be installed)

Motor type	Port A/B	Port flange threads	Drain port
G70	1 1/4" BSP	-	1/4" BSP
G75	1 1/4" BSP	-	1/4" BSP
BA80	1" 6000 PSI SAE J518/ ISO 6162 Code 62	7/16-14 UNC-2B 19 deep	7/8"-14 UNF
BA90	1" 6000 PSI SAE J518/ ISO 6162 Code 62	7/16-14 UNC-2B 19 deep	7/8"-14 UNF
BA110	1 1/4" 6000 PSI SAE J518/ ISO 6162 Code 62	1/2-13 UNC-2B 19 deep	1 1/16-12 UNF
BA125	1 1/4" 6000 PSI SAE J518/ ISO 6162 Code 62	1/2-13 UNC-2B 19 deep	7/8"-14 UNF
BA160	1 1/4" 6000 PSI SAE J518/ ISO 6162 Code 62	1/2-13 UNC-2B 19 deep	7/8"-14 UNF
BA180	1 1/4" 6000 PSI SAE J518/ ISO 6162 Code 62	1/2-13 UNC-2B 19 deep	7/8"-14 UNF

Performance table

			60 %		70 %		80 %		90 %		100 %	
			Flow	Pressure	Flow	Pressure	Flow	Pressure	Flow	Pressure	Flow	Pressure
SH1000	G70	L/min -Bar	91,0	220	99,0	256						
		USG-PSI	24.0	3190	26.2	3712						
	G75	L/min -Bar	98,0	205	106,0	239						
		USG-PSI	25.9	2973	28.0	3466						
	BA80	L/min -Bar	90,4	188	98,0	220	104,4	251	111,0	282		
		USG-PSI	23.9	2726	25.9	3190	27.6	3640	29.3	4089		
	BA90	L/min -Bar	99,5	167	107,0	195	115,0	225	122,0	251	128,5	279
		USG-PSI	26.3	2422	28.3	2828	30.4	3263	32.2	3640	40.0	4046
	BA110	L/min -Bar	122,0	139	131,4	132	140,5	185	149,0	208	157,0	231
		USG-PSI	32.2	2016	34.7	1914	37,1	2683	39.4	3016	41.5	3350
SH1400	BA125	L/min -Bar	113,0	197	122,4	230	131,0	263	139,0	296		
		USG-PSI	29.9	2857	32.3	3335	34.6	3814	36.7	4292		
	BA150	L/min -Bar	139,0	164	150,0	192	160,4	219	170,0	247	179,4	274
		USG-PSI	36.7	2378	39.6	2784	42.4	3176	44.9	3582	47.4	3973
	BA160	L/min -Bar	145,0	154	157,0	180	167,5	205	178,0	231	187,0	257
		USG-PSI	38.3	2233	41.5	2610	44.3	2973	47.0	3350	49.4	3727
	BA180	L/min -Bar	163,0	137	176,0	160	188,5	183	200,0	205	211,0	228
		USG-PSI	43.0	1987	46.5	2320	49.8	2654	52.8	2973	55.7	3306

Planning and important precautions

Prior to installation, it is important that the installer reads this guide to ensure necessary acquaintance with this product.

- This manual is intended to support educated / experienced staff and is therefore not sufficient in all details for the correct installation.
- If the height in the room you are installing the Sidepower is limited, the Sidepower can be installed horizontally or at any angle in between.
- The motor must be handled carefully.
- Beware to keep installation within adviced measurements. No part of the propeller or gearhouse must be outside the tunnel.
- The motor, its components or other joints and contol cables must be mounted so that they will keep dry at all times.
- We advice to paint the gearhouse and propellers with antifouling. PS! Do not paint the zinc anodes, sealings or propellershafts.
- Do not finish the inside of the tunnel with a layer of gelcoat / topcoat or similiar. It is only room for a thin layer of primer and two layers of anti-fouling between the tunnel and the props.
- When installed in boats approved or classified according to international or special national rules, the installer is responsible for following the demands in accordance with these regulations / classification rules. The instructions in this guide can not be guaranteed to comply with all different regulations / classification rules.

If no original Sidepower hydraulic system is installed, please ensure the following:

- Install an oil filter to keep the oil clean.
- Fit an oil cooler or use an oiltank so that the maximum oil temperature is 43 - 50 degrees Celcius.
- This thruster is supplied with a hydraulic motor only.
- The rest of the hydraulic system is the responsibility of the fitter/installer and must be within the limitations that are described in this manual so that it does not damage the thruster.
- It is very important to use a hydraulic valve that has flow and pressure limits that are either set within or can be adjusted to be within the limits of the thrusters capability.
- We also strongly recommend that a shock valve are fitted and set to 10% - 15% above the chosen maximum pressure set in the valve. This will prevent that the system is dammaged if the propellers are blocked by any reason.
- It is also required that a device is installed to ensure that the drive direction can not be suddenly changed, as this can seriously dammage the gearhouse. This can be done by adding an electronic time lapse / delay safety on the electric control system or by using a valve that has this type of protection built in. The required time delay is 1 second.

NB ! Faulty installation of the tunnel, thruster or panel will render all warranty given by Sleipner Motor AS void.

Fig. 1

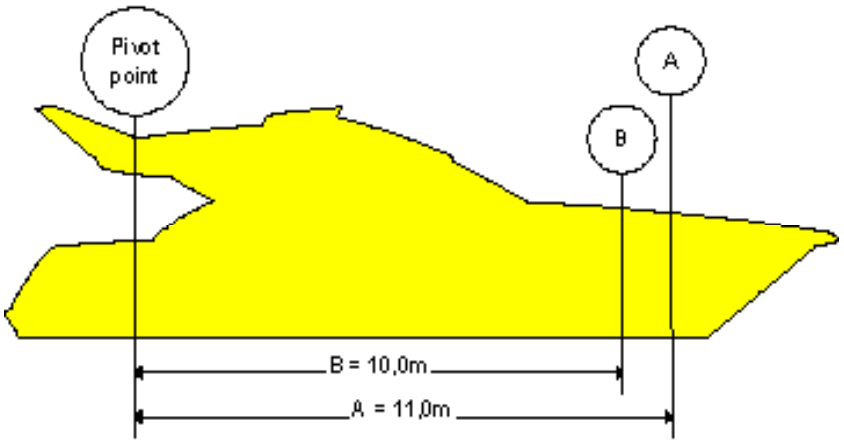


Fig. 2

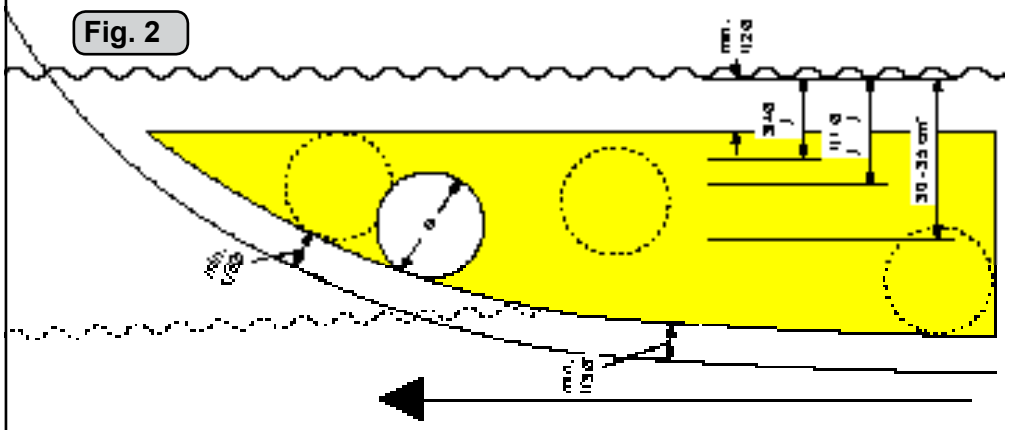


Fig. 3

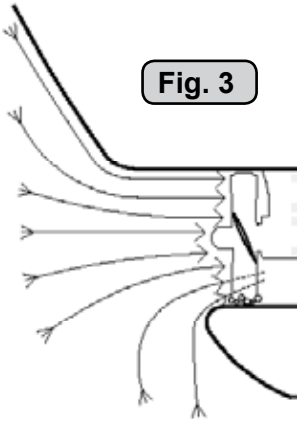
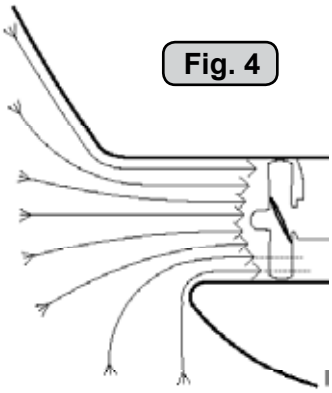


Fig. 4



EN Positioning of the tunnel / thruster

The Thruster should be as far forward as possible (Fig. 1)
Because of the leverage effect around the boats pivot point, it is very important for the thrusters actual effect in the boat to get it as far for-ward as possible. The relative distance change from the boats pivot point to the thruster will be the change of actual thrust for the boat.
Example :
A: 100kg thrust x 11m leverage = 1100kgm torque to rot. the boat
B: 100kg thrust x 10m leverage = 1000kgm torque to rot. the boat
In position A you will get 10% more thrust to turn the boat around.

The thruster should be placed as deep as possible (Fig. 2)
The tunnel should be placed as deep as possible for two reasons:
1. So that it does not suck down air from the surface which will destroy the thrust completely.
2. To get as high as possible a water pressure to get maximum efficiency from the propeller.

Generally the top of the tunnel should be a minimum of 1/2 x the tunnel diameter below the waterline. This is an absolute minimum and we recommend that it is at least 3/4 x tunnel diameter (☺) below the waterine. A really good distance is about 1/1 x tunnel diameter (☺☺) below the waterline.
When you get the top of the tunnel 30-35 cm* / 1 feet below the surface, other factors should be considered more important, i.e. moving the thruster further forward.

Optimal tunnel length
If the tunnel gets to long, the friction inside will reduce the water speed and thereby the thrust.
If the tunnel gets to short (normally only in the bottom section of the tunnel) you can get cavitation problems as the water will not have had time to “straigthen” itself before reaching the propeller (Fig. 3/4). This cavitation will reduce performance as well as creating a lot of noise.
The optimal tunnel length is 2 to 4 x tunnel diameter and you should avoid tunnels longer than 6 to 7 times the tunnel diameter as the performance reduction is then clearly noticeable.

N Plassering av tunnel og thruster

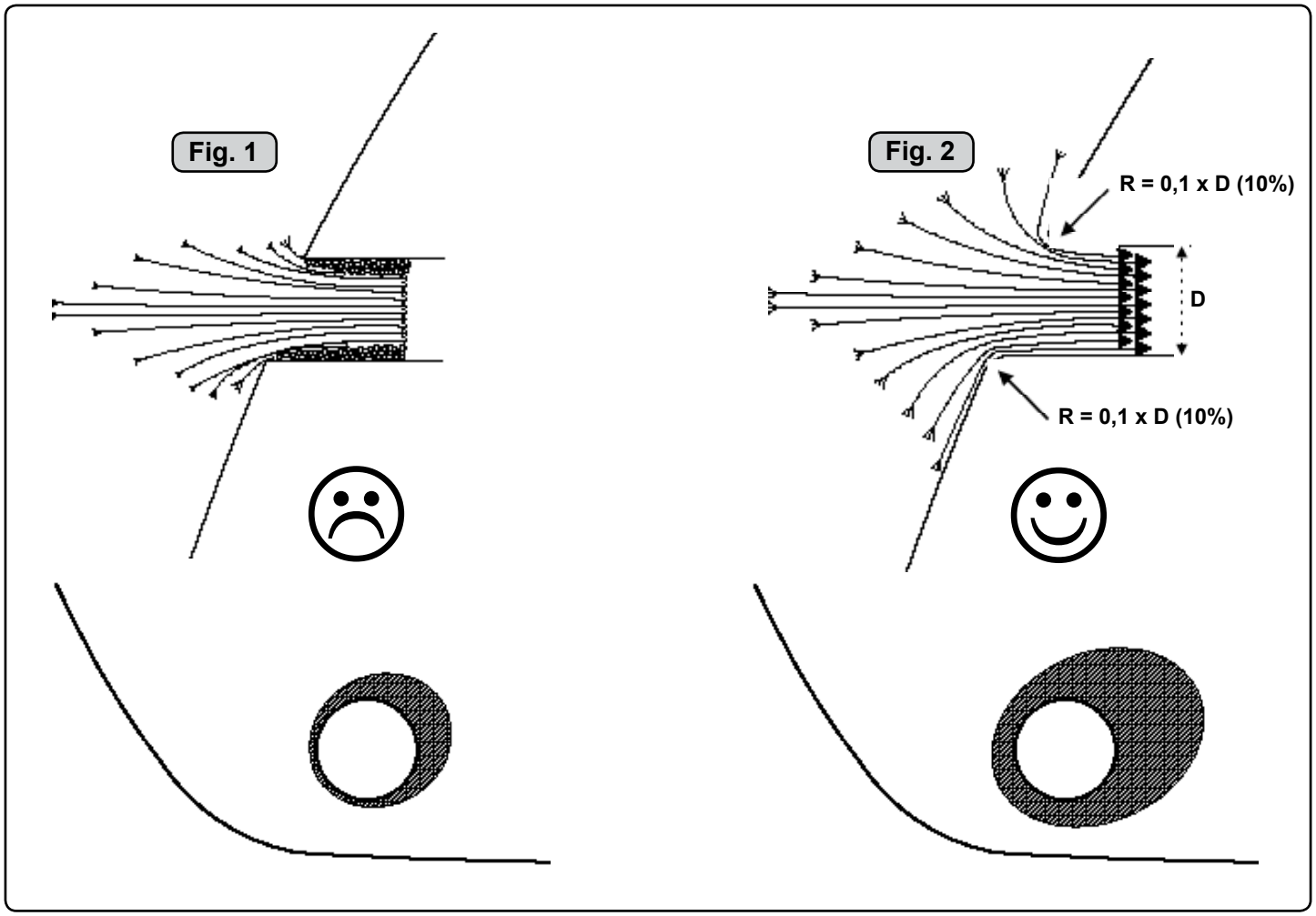
Tunnelen bør plasseres lengst mulig frem i baugen (Fig. 1)
For å oppnå mest mulig moment rundt båtens dreiepunkt, er det meget viktig å plassere tunnelen så langt fremme som mulig. Avstanden fra båtens dreiepunkt til thruster vil ha stor betydning på thrusterens effekt.

Eks.:
A: 55kg skyvekraft x 11m moment = 605kgm skyvekraft
B: 55kg skyvekraft x 10m moment = 550kgm skyvekraft
Posisjon A vil gi 10% mer skyvekraft til rotasjon.

Tunnelen skal plasseres dypest mulig (Fig. 2)
Tunnelen skal plasseres så dypt som mulig av to grunner:
1. Så luft ikke suges ned i tunnelen og ødelegger skyvekraften.
2. Ved å øke vanntrykket jobber propellen mer effektivt.

Hovedregelen er at tunnelen skal plasseres minimum ½ x tunnelen dia. under vannlinje. Anbefalt dybde er minst ¾ x dia. under vannlinje (☺). Når tunnelen er plassert 33-35 cm under vannlinjen bør andre faktorer vurderes som viktigere, d.v.s. å plassere tunnelen lengre frem.

Optimal tunnel lengde
Dersom tunellen blir for lang vil friksjonen i tunellen reduser vannhastigheten og derved effekten.
Dersom tunellen blir for kort (normalt bare i nedre del av tunellen) kan det oppstå kavitasjons problemer da vannet ikke har tid / av-stand til å «rette opp strømningsretningen» før det treffer propellen (Fig. 3&4). Denne kavitasjonen vil redusere effekten og lage mye støy.
Den optimale tunell lengden er 2 til 4 ganger tunell diameteren og dersom tunellen blir så mye som 6 til 7 ganger diameteren i lengde vil effekt tapet bli klart merkbart.



EN Tunnel ends

Rounded tunnel ends will maximize thrust and minimize noise.

We recommend to round the tunnel connection to the hull-side as much as possible.
The optimum rounding has a radius of 10% of the tunnels diameter.

Important advantages over sharp tunnel to hull connections are:

1. The rounded tunnel end will prevent creation of turbulence / cavitation that will come from a sharp tunnel end when water passes by fast, thereby preventing a double negative impact on the thrust and noise level (Fig. 1&2).
   - The turbulence / cavitation blocks the outer area of the tunnel and thereby reduces the effective tunnel diameter and thrust.
   - The turbulence / cavitation hits the propeller and thereby reduce the propellers performance and creates noise.
2. The curved tunnel end makes the thruster take water also from along the hull-side, creating a vacuum that will suck the boat sideways and thereby give additional thrust (Fig. 3&4).
   With a sharp tunnel end, the thruster will be unable to take water from along the hull-side, and you will not get the desired vacuum and additional thrust.
   This "free" additional thrust can in optimal installations be as much as 30 - 40% of the total thrust.

NB! A Sidepower thruster propeller does not cavitate at working speed so that all cavitation and cavitation noise in the tunnel will be caused by the tunnel installation.

NB! Even if it is not possible to make the perfect rounding, it is very important to round the tunnel end as much as possible. A angled tunnel to hull connection will also do much of the same job as a rounded connection (see page 20, Fig. 1b&1d).

N Tunnelåpninger

Avrundede åpninger vil minke støy, og maksimere effekt.

Vi anbefaler å avrunde tunnelåpningene mest mulig.
Den optimale avrundingen har en radie som er 10% av tunnelens diameter.

Hvorfor er en avrundet tunnelåpning så viktig?

1. En avrundet tunnelåpning vil forhindre at det oppstår turbulens / kavitasjon, noe som vil oppstå ved en installasjon med skarpe kanter. Turbulensen forårsaker mer støy, og begrenser skyvekraften.
   - Turbulensen / kavitasjonen blokkerer tunnelen og svekker skyvekraften.
   - I det kavitasjon og turbulens når propellen påvirkes ytelsen til denne og øker støyen.

2. En avrundet tunnelåpning gjør også at thrusteren suger vann langs skroget på båten. Dermed oppstår det et lavtrykk som vil hjelpe å suge båten i dreieretningen. Med skarpe åpninger klarer ikke thrusteren å suge vann langs skroget, og lavtrykket uteblir. Så mye som 40% av skyvekraften har blitt målt til å ligge her på noen installasjoner.

NB! Propellene til Side-Power thrustere kaviterer ikke på arbeidshastighet, så kavitasjon og støy som oppstår som følge av kavitasjon, skapes av tunnelinstallasjonen.

NB! Selv der en perfekt avrunding ikke er mulig er det viktig å runde av kantene så mye som mulig, en tunnelåpning med skråkant vil ha stor effekt fremfor en med skarpkant (se side 20, ill. 1b & 1d).

Fig. 1

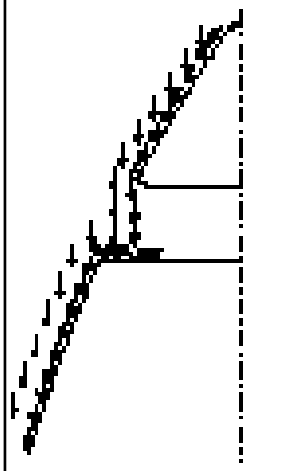


Fig. 2

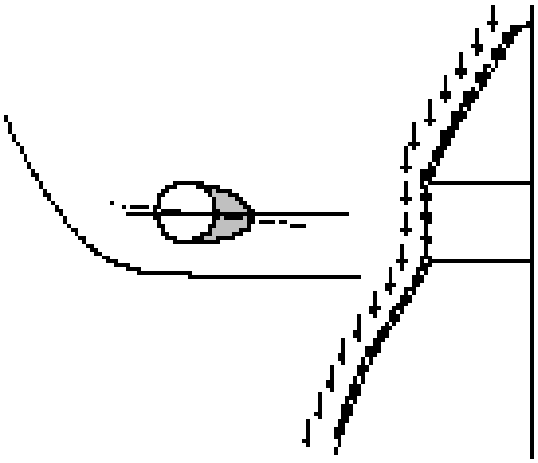
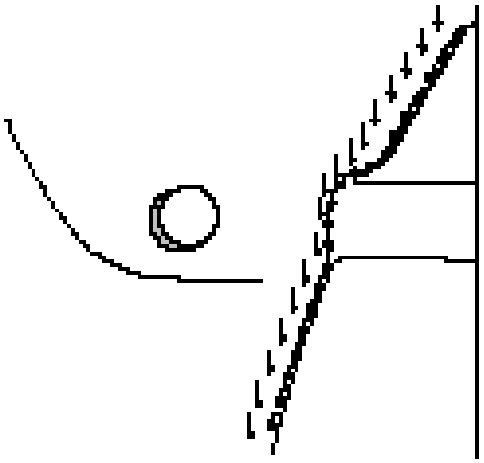


Fig. 3



EN Prevent drag from tunnel

A possible problem in sailboats or fast powerboats, is that they get a drag from the back face of the tunnel, as this becomes a "flat" area facing the water flow (Fig. 1).

This can also create problems with the thruster spinning (passive) and making noise while sailing or driving the boat with water being pushed through the tunnel at high speed.

This can be solved in two different ways, depending on what is possible or more easy to do.

1. The best solution which normally reduces the drag most, is to make a recess in the hull at the back of the tunnel.
   Thereby the back face is gone and about all the drag (Fig. 2).
   The depth and shape of this recess will depend on the boat. Basically you should not see the back face of the tunnel when standing directly in front of the tunnel at the angle of the boats centreline.
   The angle up or down backwards of the insert in the hull, depends on the hullshape, but normally it is angled slightly down because of the waterflow on this area of the hull.

2. The drag will also be reduced a lot, especially in fast power boats, by making a deflector / spoiler in front of the tunnel.
   This will push the waterflow out from the hull so that most of it passes by the back face of the tunnel (Fig. 3).
   The shape and size of this deflector will depend on the hull shape. Basically you should not see the back face of the tunnel when standing directly in front of the tunnel at the angle of the boats centreline.
   The easiest way of making this is to let a part of the tunnel stick out in the lower forward area of the hole, and use this as a support to mould a soft curve / spoiler shape.

Remember to still round the tunnel ends as much as possible to get optimum thruster performance and minimum noise.
More information on how to practially do this on pages 6.

N Motstand forårsaket av tunnel

Et mulig problem for seilbåter eller meget hurtiggående båter er motstand i tunnelen. Aktre ende på tunnelen vil være en liten loddrett flate mot vannstrømmen som skaper uønsket motstand.

Denne flaten kan også forårsake problemer med at vann føres inn i tunnelen under seilas, eller kjøring i høy fart og får da propellen til å rotere, dette skaper uønsket støy.

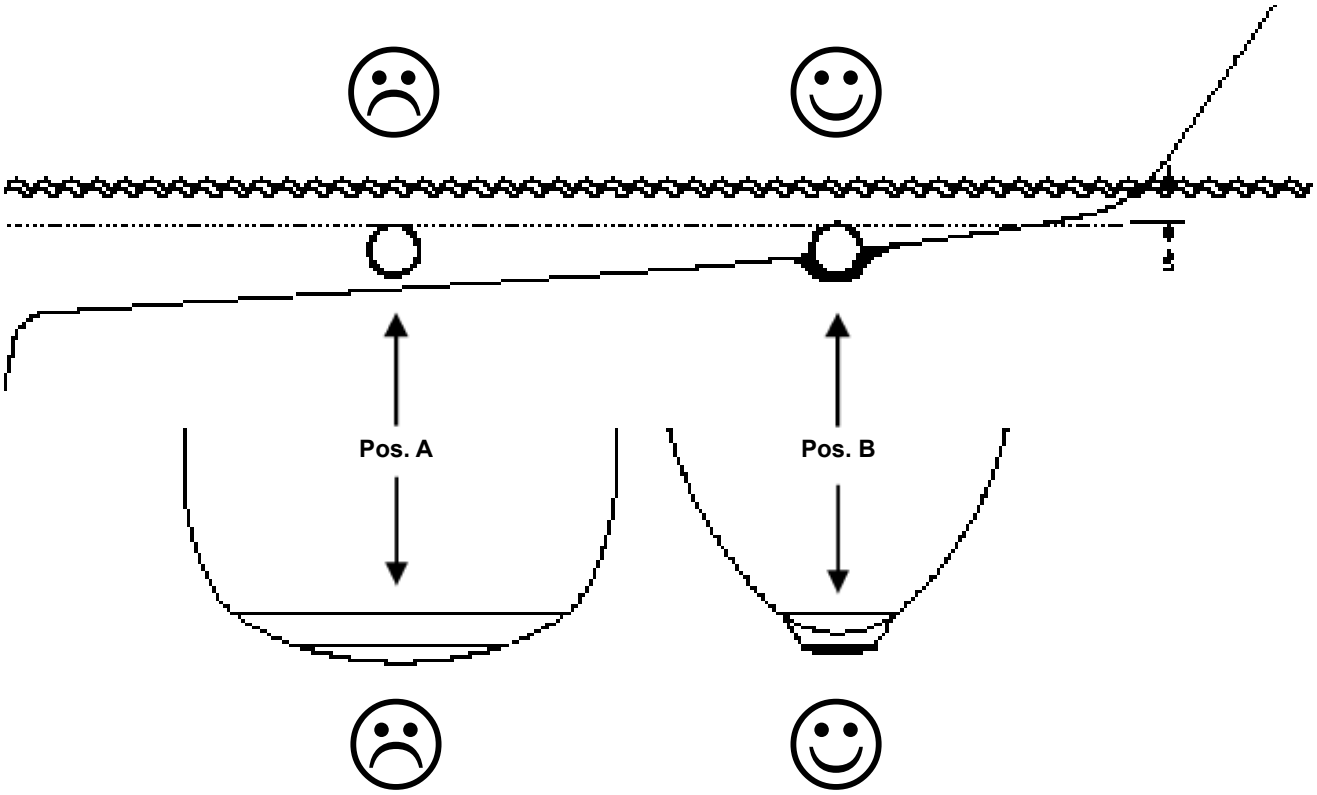
Det er to mulige løsninger på problemet, avhengig av hva som er enklest å få til på båten.

1. Den løsningen som vanligvis reduserer motstanden mest er å lage en fordypning i skroget i aktre ende av tunnelåpningen. Den loddrette flaten vil da forsvinne og dermed motstanden. Hovedregelen å følge er at bakkanten av tunnelen ikke skal synes når man står rett foran båten og titter akterover langs båten senterlinje. Dybden, utformingen og vinkling av fordypningen avhenger av båttypen, og hvordan vannet følger skroget, men de fleste båter vil være tjent med en fordypning som vinkler lett nedover (Fig. 2).

2. Motstanden vil også reduseres av en spoiler i forkant av tunnelen. Spoileren fører det meste av vannstrømmen rundt og forbi tunnelen. Størrelsen og utformingen på spoileren avhenger av båten. Hovedregelen er at bakkanten av tunnelen ikke skal synes når man står rett foran båten og titter akterover langs båten senterlinje. Den enkleste måten å lage spoileren på er å la tunnelen stikke ut i forkant av tunnelen, og forme spoileren opp mot den (Fig. 3).

Det er alltid viktig å avrunde tunnelåpningene mest mulig for å motvirke støy og for å få mest mulig effekt av thrusteren.
Mer informasjon om dette på side 10.

Fig. 1



EN Tunnel installation in sailboats

Many sailboats have a racing type hull which means that it is very flat bottomed and has a very shallow draft in the bow section. It is thereby very difficult not to say impossible to fit a tunnel thruster the usual way, at least as far forward in the hull as a thruster should be (Fig. 1).

However, it is possible to install a tunnel thruster in most sailboats, even when the hull does not directly support the fitting of a tunnel.

This is done by fitting the tunnel halfway into and halfway underneath the exisiting hull and then strengthen it and smoothening the waterflow by moulding a bulb around / underneath the tunnel.

This will allow installation in good position on the boat, maintaining the reliability and space advantages of a tunnel thruster.

This installation is being used by some of the worlds absolute largest sailboat builders, and have been proven to give little to no speed loss for normal cruising.

This can also be a good installation method for flat bottomed barges to avoid extremely long tunnels and huge oval tunnel openings in the hull.

N Tunnelinstallasjon på seilbåter

Mange seilbåtskrog er bygget for å oppnå høy fart. De har brede skrog som ikke stikker dypt i baugen. Skrogtypen gjør det vanskelig å installere en thrustertunnel på vanlig måte, spesielt med tanke på å plassere den langt nok frem (Fig. 1).

Thrustertunneler kan allikevel installeres i de fleste seilbåter. Dette gjøres ved å la en del av tunnelen stikke ut i underkant av skroget. Tunnelen er sterk nok til dette, og thrusteren blir plassert lav nok og langt nok fremme.

Dette gjøres ved at øvre halvdel av tunnelen støpes inn i skroget, tunnelen styrkes i underkant ved å støpe en kul rundt tunnelen og jevne den ut mest mulig.

Denne metoden brukes av noen av de helt største seilbåt-produsentene i verden, de viser til at den ikke gir utslag på fart under normal seilas.

Denne installasjonen kan også være gunstig for båter med flate bunner, for å unngå ekstremt lange tunneler og store ovale tunnelåpninger.

Fig. 1

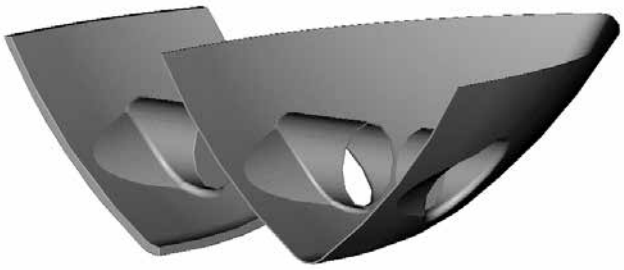


Fig. 2

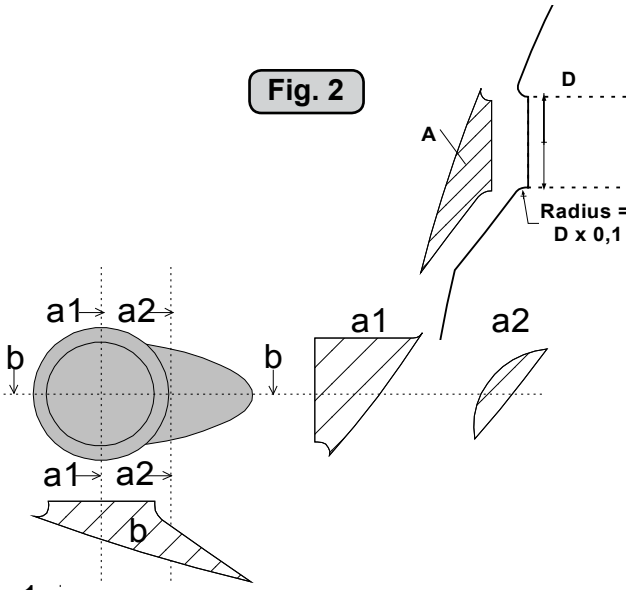


Fig. 3

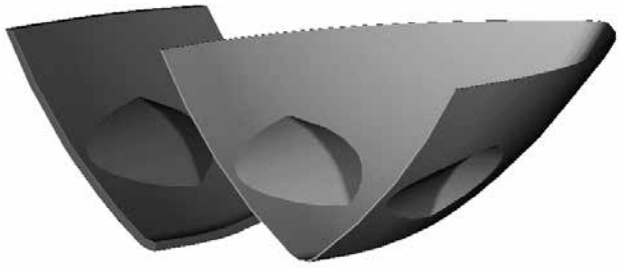
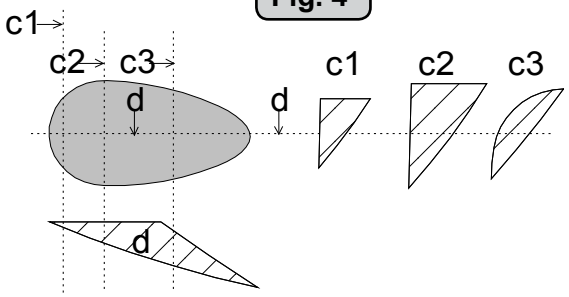


Fig. 4



EN Series production installation

Boat builders having thrusters as standard, or delivering a large portion of one or more models with thrusters, have the opportunity to make a perfect tunnel installation, while saving both time and money on each installation (Fig. 1).

The solution is to make an insert / plug in the hull mould, which prepares the hull for an easy tunnel installation with features for maximum thrust and minimal drag (Fig. 2).

This insert / plug in the mould is not very difficult to make, and as it will have to be a "bolt on" in the mould in order to get the boat out, you can still make boats without this hull feature. (Some boat builders have this in the hull also on boats that are delivered without a thruster as they know many people will fit this later)

By having a flat surface to fit the tunnel to, the installation time and cost for the tunnel will also be reduced as:
- it is very easy and fast to cut the now circular hole for the tunnel
- it is easier to mould inside all around the tunnel
- you save tunnel length

The plug in the mould can also be made so that it can be a fixed part of the mould, but the rounded end option must then be made later to get the hull out of the mould (Fig. 3&4).

N Installasjon ved serieproduksjon

Båtbyggere som har trustere som standard eller leverer en eller flere modeller med valgfri truster i stort antall har mulighet for å lage en perfekt tunnelinstallasjon og samtidig spare tid å penger (Fig. 1).

Løsningen er å lage en plugg/innsats i formen, som klarrgjør skroget for anklest mulig tunnelinstallasjon og som samtidig har perfekt utforming for maksimal trust og minimal motstand (Fig. 2).

Pluggen/innsatsen er ikke komplisert å lage og siden den må skrus fast i formen på grunn av slipp kan skrogene fremdeles lages uten denne løsningen. (Enkelte båtbyggere velger også denne løsningen på båter levert uten truster da de vet at mange vil velge å ettermontere en truster)

Ved å ha en rett flate å montere tunnelen på, reduseres installasjonstiden og kostnaden for tunnelen siden:
- det blir eldig enkelt og raskt å skjære ut det nå sirkulære hullet til tunnelen
- det er enklere å støpe inn tunnelen langs hele omkretsen
- du sparer lengde på tunnelen

Pluggen i formen kan også lages på en slik måte at den inngår som en fast del, men da må avrundingen lages etterpå for å oppnå slipp i formen (Fig. 3&4).

Fig. 1

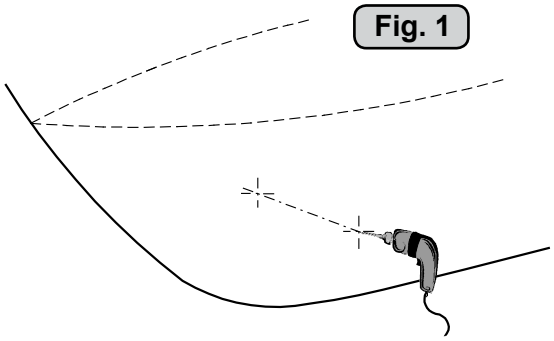


Fig. 2

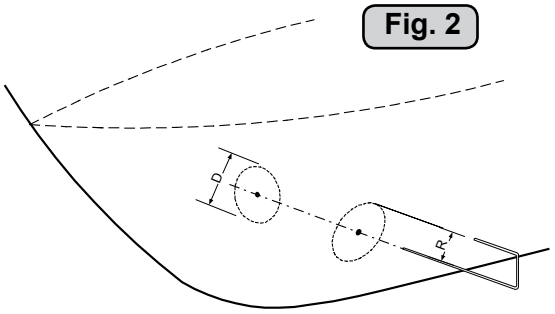


Fig. 3

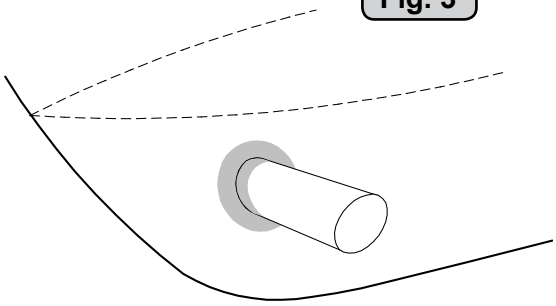
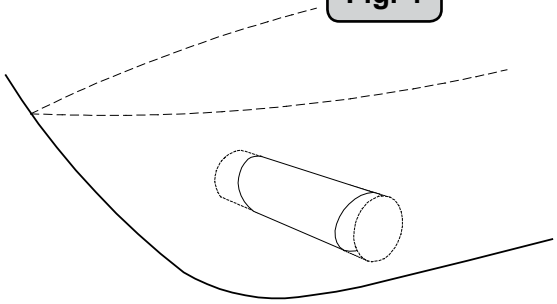


Fig. 4



EN Tunnel installation

We recomend that a professional does the fibreglass fitting of the tunnel. These instructions are only general, and do not explain in any way the details of fibreglass work. Problems caused by faulty installation of the tunnel, are the installers full responsibility.

Find the position in the boat considering the information given earlier in this manual and the applicable measurements for the thruster model you are installing.

Mark the centre of the tunnel on both sides. Drill a 6mm hole horizontally in these marks (Fig. 1) .

Bend a ø 5mm steel bar as shown with the "tip" bent back at the tunnel radius and mark the circle for the tunnel opening (outside diameter of the tunnel). Cut the hole with a jigsaw (Fig. 2).

Grind off the gelcoat and polyester so that you are down in the “real fibreglass” in an area of 12cm around the hole both inside and outside in the hull to cast the tunnel to the hull (Fig. 3).

Insert the tunnel and mark its shape to fit the hull (Fig. 4). If you are installing with a deflector/spoiler, leave a part or the tunnel of the front- and underside of the tunnel to have a base for this (see page 12, Fig. 2). Cut the tunnel ends to the desired shape and lightly sand its surface and clean with aceton or similar where you are going to apply fibreglass.

NB! Do not cast/glass on the area were the thruster will be placed.

Then cast the tunnel to the inside of the hull, use at least 8 layers of 300 g glass and resin, preferrably alternating mat and rowing types of fibreglass (see page 18, Fig. 1). If you are rounding the tunnel ends to the perfect 10% radius you may in some cases have to make further layers inside to preserve the desired hull thickness.

NB ! Make sure that any gap between the tunell and the hull are completely filled with resin/fibreglass. In areas where you can not access to make normal layers of resin/fibreglass, a resin/ fibreglass mixture must be filled in that area.

N Tunnelinstallering

Sleipner Motor anbefaler at innstøping av glassfibertunnelen utføres av kyndig personell. Denne instruksjons manualen gir ikke detaljerte opplysninger om glassfiberstøpning. Problemer som skyldes installering er installatørens fulle ansvar.

Bestem plassering av tunnelen ut i fra informasjonen gitt tidligere i manualen, og de angitte mål for thrusteren du skal installere.

Merk av senter på tunnelen på babord og styrbord side. Bor et 6 mm vannrett hull, på begge sider (Fig. 1).

Bøy til og tilpass en 5 mm stålstang, som vist på fig. 2 der den tilbakebøyde enden skal markere tunnelens radius. Stikk enden inn å marker tunnelens ytre diameter, skjær ut hullet med en stikksag (Fig. 2).

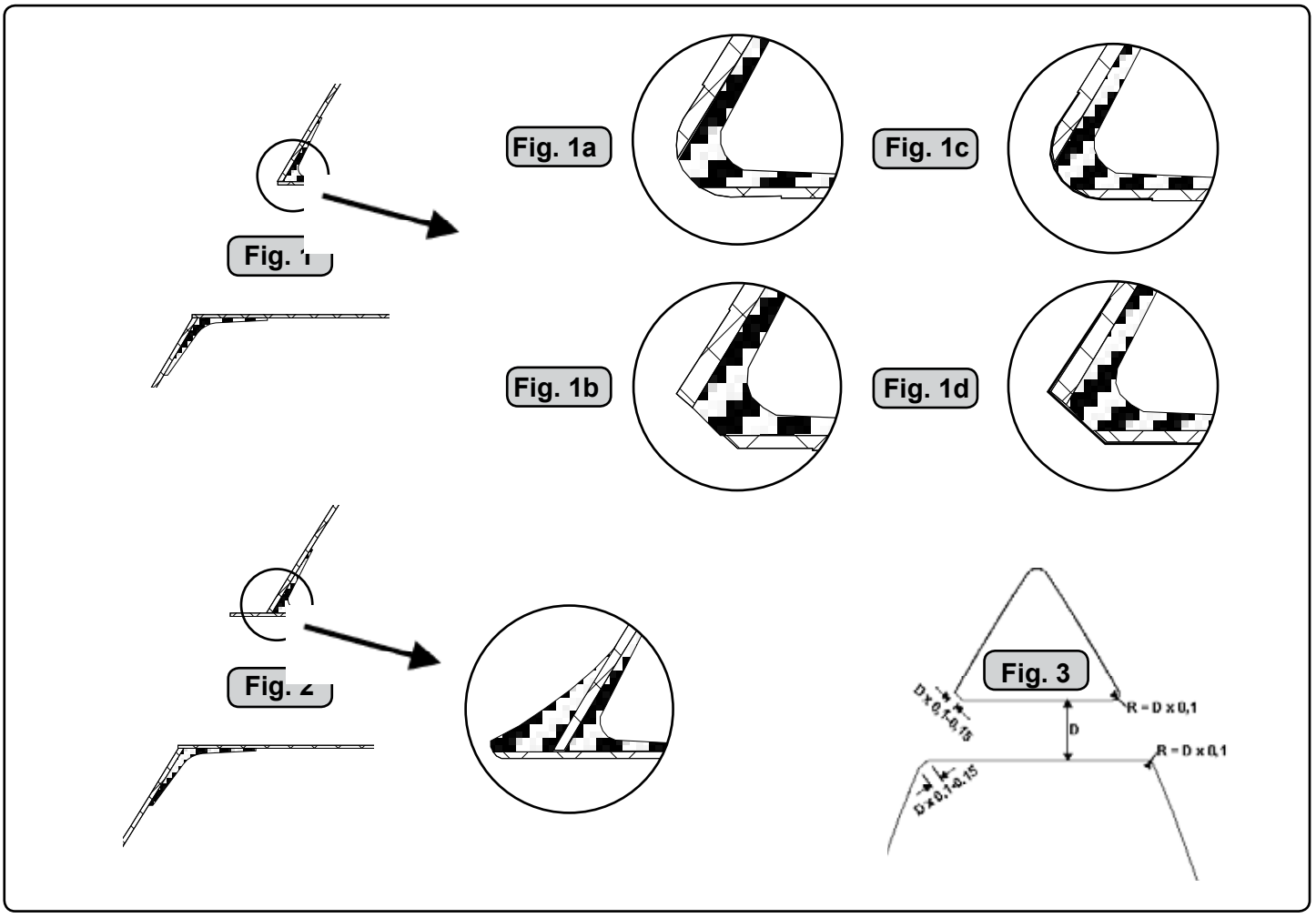
Puss av gelcoat og polyester så glassfiberen ligger bar i et 12 cm stort område rundt tunnel hullet. Dette må gjøres på innsiden og utsiden av skroget, før tunnelen støpes fast i skroget (Fig. 3).

Sett inn tunnelen å marker hvor det skal kappes for å passe i skroget (Fig. 4). Hvis det skal støpes en spoiler i forkant av tunnelen bør en del av tunnelen stikke ut i for og underkant av skroget for å støpe spoileren mot (Side 10, Fig. 2). Kapp tunnelen i ønsket størrelse. Slip lett med slipepapir, og vask med aceton der hvor det skal støpes med glassfiber.

NB ! Det må ikke støpes der hvor thrusteren skal monteres.

Støp fast tunnelen først på innsiden av skroget, bruk minst 8 lag med 300 g Glassfibermatte, og polyester. Ved bruk av alternative materialer, glassfiber matter eller rovingtyper (Se s. 10, Fig. 1). Hvis tunnelåpningene avrundes til den optimale 10% radius må ofte legge ekstra lag med polyester glassfibermatte på innersiden av tunnelen, for å oppnå riktig tykkelse i forhold til skrogtykkelsen.

NB ! Forsikre deg om at overgangene mellom tunel og skrog er nøye sammenstøpt. På steder en ikke kommer til med vanlige lag med polyester/glassfiber matte, sørg for og lage en blanding av polyester og glassfiber, som fylles i dette.



EN Tunnel installation

Soften the edges with a radius of 10% of the tunnel diameter (Fig. 1a) or make a slope with a length of 10 - 15% of the tunnel diameter (Fig. 1c). If this is not possible, atleast round the tunnel end as much as possible.

We advice to also cast two layers on the outside of the tunnel/ hull for an area 6-8cm (Fig. 1c&1d).

You must apply gelcoat/topcoat/epoxy on the areas outside where you have grounded or moulded to again make these waterproof.

NB ! All original Sidepower tunnels are fully waterproof when they are delivered.

This means that unless you want, because of special reasons, to have another colour on it, you do not have to apply Gelcoat/Top-coat or the several layers of primer that is necessary on the boats' hull to make it waterresistant.

Sand it very lightly and apply one layer of primer to make the antifouling sit.

The original Sidepower tube itself is fully waterresistant without treatment exceptin the areas where you have bonded it to the hull.

Apply gelcoat/topcoat/epoxy paint and primer on the areas where you have grounded or moulded as these areas give the water access to the hull which normally is not waterproof without these applications outside.

PS ! Avoid all casting where the motor-bracket is to be placed, as this will cause misfit and possible failure of the gearhouse.

N Tunnelinstallering

Rund av tunnelendene med en radius 10% av tunneldiameter (Fig. 1a), eller lag en skråkant 10-15% av tunneldiameter (Fig. 1c). Der dette ikke er mulig skal tunnel kantene rundes av mest mulig.

Vi anbefaler å støpe to lag utenpå tunnelavrundingen og over et område på 6-8cm (Fig. 1c & 1d).

Gelcoat eller lignende må påføres på områdene der det har blitt pusset eller støpt for å gjøre glassfiberen vanntett.

NB ! Alle originale Side-Power tunneler er vanntette ved levering!

Så fremt man ikke ønsker en annen farge er det ikke nødvendig å påføre Gelcoat, Topcoat og flere lag med primer for å gjøre tunnelen vanntett.

Puss tunnelen med fint slipepapir og påfør et lag primer for å få bunnstoff til å sitte.

Side-Powertunnelen er helt vanntett uten behandling med unntak av de områder det som er støpt fast i skroget.

Påfør Gelcoat/Topcoat/epoxy og primer på de områder som er pusset ned eller støpt. Vann skal ikke ha direkte kontakt med glassfiberen i skroget fordi dette normalt ikke er vanntett.

PS ! Det må ikke støpes der braketten til thrusteren skal stå. Passformen er nøyaktig tilpasset, og en feilplassert brakett kan forårsake svikt i girhus.

Fig. 1

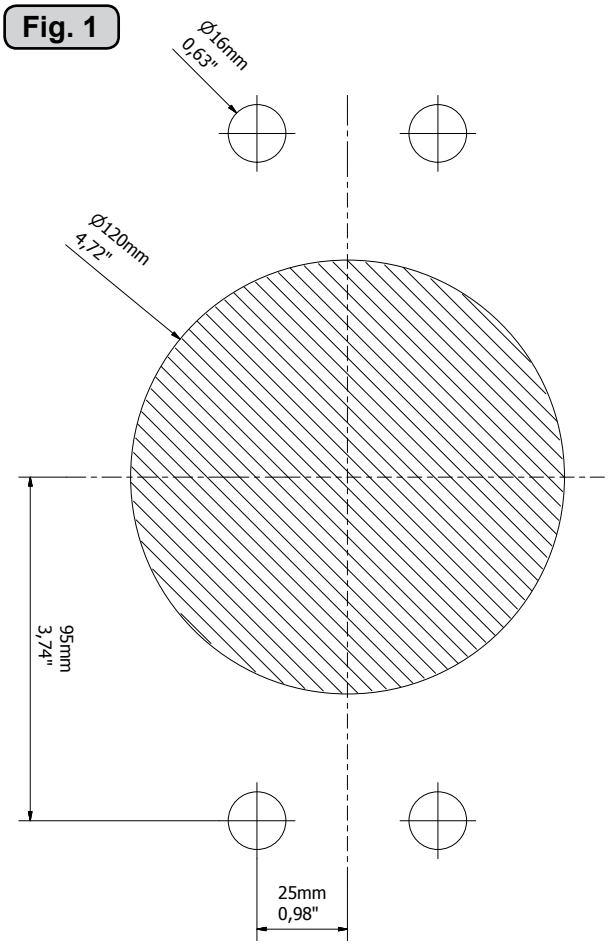


Fig. 2

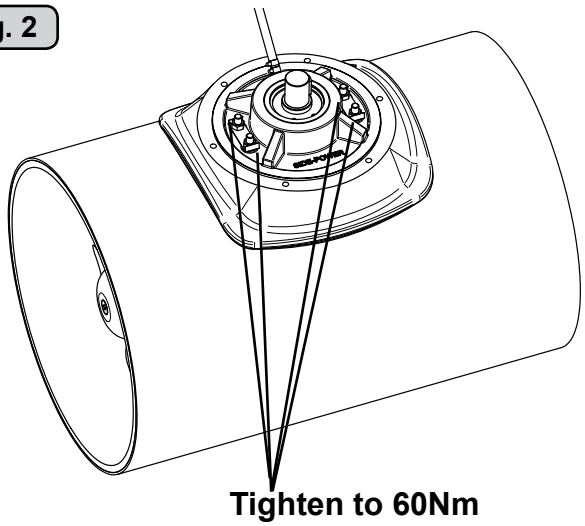
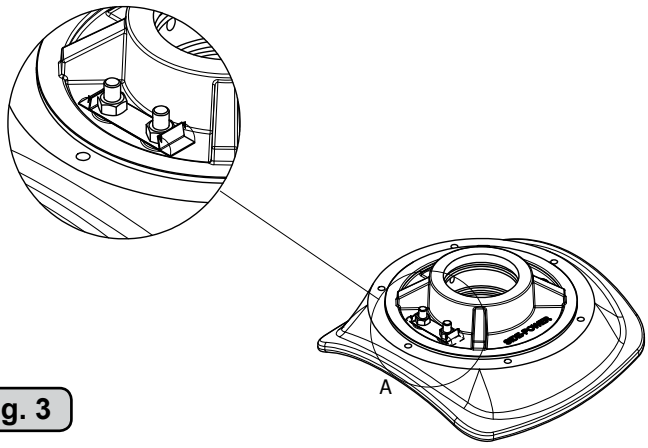


Fig. 3



EN Fitting gearhouse and motor bracket

1. Mark the centreline of the tunnel and the boats centreline. *The gearhouse must be fitted with the gearhouse lid (the screwed in lid behind one of the propellers) on the starbord side of the boat for the thrust direction to correspond with the controlpanel.*
2. Use the gearhouse gasket (7) to mark the centre of the holes and double check the measurements.
   Place the thruster in the boats centreline with the bolt hole as the centre (Fig. 1). It is absolutely necessary that all holes are in-line with the tunnels' centreline to ensure precise installation, as the clearance between the propellers and the tunnel is minimal to ensure best possible performance.
3. There must be no casting where the motor bracket is to be placed, as this will cause possible failure of the gearhouse. The motor bracket must fit steady on the tunnel, if the tunnel is not smooth, all bumps or uneven parts must be grinded smooth.
4. Drill the centre-hole and then the four screw-holes according to fig. 1.
5. Fill the gearhouse with 4,5 liters of GL-5 gear oil
6. Try the lower-unit in the tunnel by using the gasket inside the tunnel. Try on the propellers to make sure they are in the middle of the tunnel and turn freely with the same clearing from each blade to the tunnel. Use some sealant to ensure that no leakages occur.
7. Push the gearhouse through the main hole in the tunnel and push the gearhouse and motor-bracket gently together.
8. Screw the lower unit and the motor-bracket together with the four provided bolts and lock washers (Fig. 2). Tighten with 60 Nm.
9. Lock the bolts according to fig. 3

N Montering av girhus og brakett

1 Marker båtens og tunnelens senterlinje på tunnelen. *Girhuset må plasseres med enden merket P mot babord og enden merket S mot styrbord for at skyveretning skal korrespondere med merkingen på kontrollpanelene.*

2. Bruk girhuspakningen for å sjekke målene (7). Trusteren skal plasseres på styrbord side av senterlinjen med boltehullet i midten av båten (Fig. 1). Alle hull må være på båtens eller tunnelens senterlinje for å får til en presis installasjon. Dette skyldes at det er meget liten klaring mellom tunnelveggen og propellen.
3. Tunnelen må ha en jevn overflate der braketen skal festes, all støp, evt glassfiber- eller epoxy-rester må pusses ned så braketten passer jevnt på tunnelen. Ujevnheter her vil resultere i svikt i girhuset.
4. Bor senterhullet og de fire boltehullene i henhold til Fig 1.
5. Fyll girhuset med 4,5 liter GL-5 girolje.
6. Prøv girhuset i tunnelen sammen med pakning. Monter propeller og sjekk at de er i midten av tunnelen. Hvis propellene ikke er i midten av tunnelen, forsøk å bruk den andre pakningen, eller begge to samtidig. Bruk tetningsmateriale for å sikre mot lekkasje.
7. Før girhuset gjennom hovedhullet i tunnelen og monter braketten og girhuset forsiktig sammen.
8. Skru sammen motorbraketten og girhuset med orginalbolter og låseskiver (Fig. 2). Tiltrekningsmoment: 60Nm
9. Lås boltene i henhold til Fig. 3

Fig. 1

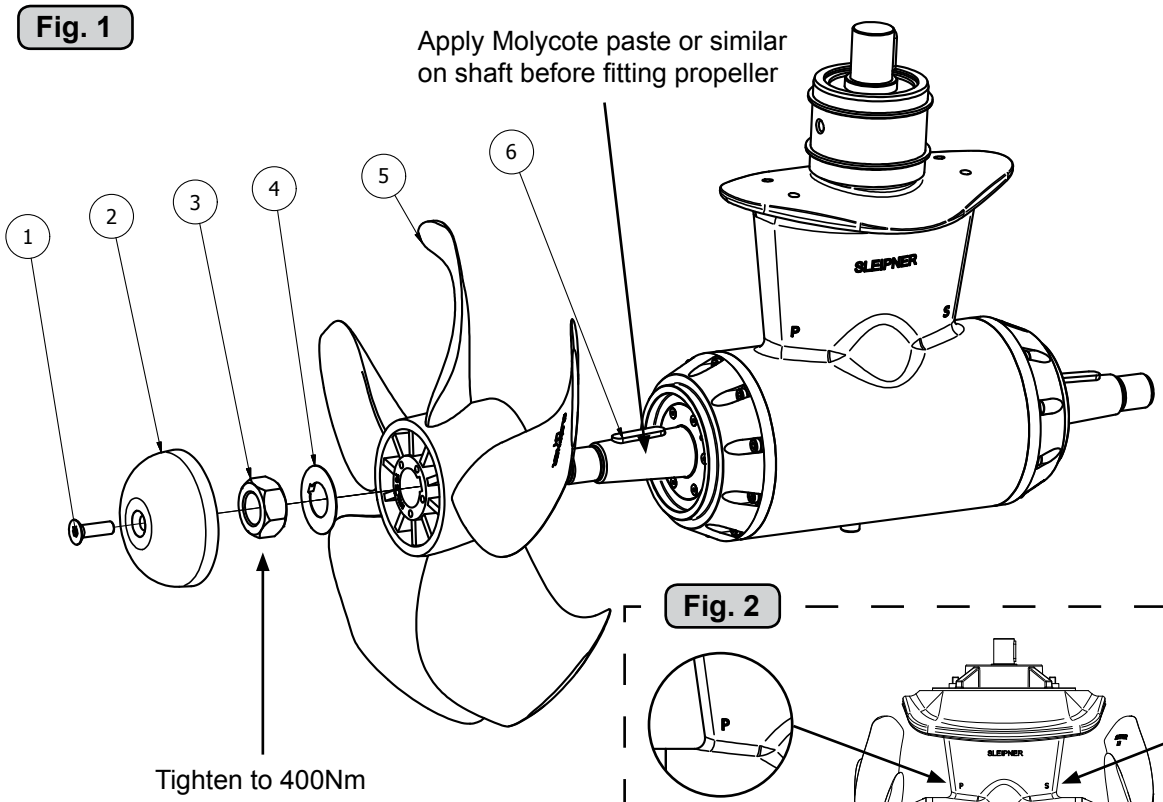
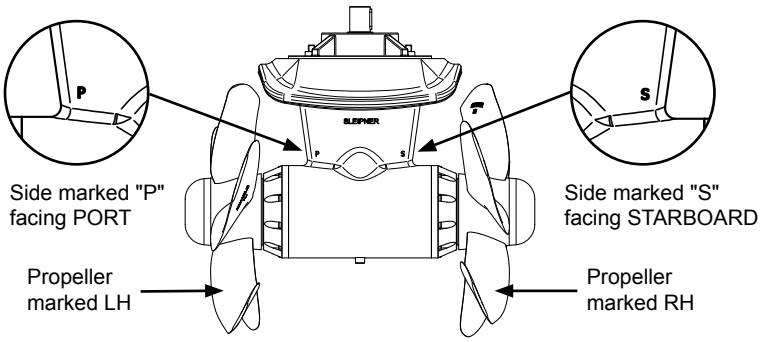


Fig. 2



EN Fitting propellers

1. Turn the propeller shaft so that the key (6) is in a horizontal position. Apply Molycote paste or similar on the propeller shaft.
2. Push the propeller onto the shaft all the way in. There should be almost no gap between the propeller hub and the gearhouse. Use grease to prevent sticking.
3. Place the locking/tab washer (4) on the propeller shaft with tab aligned in keyway slot. Then tighten the hex nut (3) on the propeller shaft to 400Nm. Bend the washer up onto the flat faces of the nut to lock the nut in position.
4. Place the anodes (2) in its designated position and tighten the anode holding screws (1). Apply a thread glue (Loctite or similar) to ensure that the anodes holding screw does not unscrew itself from the propellers rotation.

   Fit the propellers to the shaft with the propeller marked LH on the port side and the propeller marked RH on the starboard side (fig. 2). Turn them again to make sure the they move freely and as much in the centre of the tunnel as possible.

Parts description:
1 : Screw for anode
2 : Anode
3 : Hex nut
4 : Lock Washer
5 : Propeller
6 : Key for propeller

IMPORTANT:

Please check correct side of gear leg relative to their rotation direction (fig. 2) before launching the boat.

N Montering av propeller

1. Vri propellakselen slik at kilen (6) er på oversiden. Smør Molycote pasta eller tilsvarende på propellakselen.
2. Skyv propellen helt inn på akselen. Det skal være tilnærmet ingen avstand mellom propellens nav og girhuset. Bruk fett for å forhindre at propellen setter seg på akselen.
3. Plasser låseskiven (4) på propellakselen med tappen i kilesporet og stram mutteren (3) med 400Nm. Bøy låseskiven opp langs mutterens flate sider for å låse mutteren.
4. Plasser anodene (2) på angitt sted og stram låseskruene (1). Bruk gjengelim for å sikre at ikke skruene løsner på grunn av propellenes rotasjon

   Propellen merket LH monteres på babord aksel og propellen merket RH monteres på styrbord aksel (fig. 2). Sjekk at propellen roterer fritt og er sentert så mye som mulig i tunnellen

Delebeskrivelse:
1 : Festeskrue for anode
2 : Anode
3 : Mutter for propell
4 : Låseskive
5: Propell
6 : Kile for propell

Viktig:

Sjekk at girhuset er orientert korrekt (fig. 2) i forhold til dreieretningen før båten sjøsettes

Fig. 1a

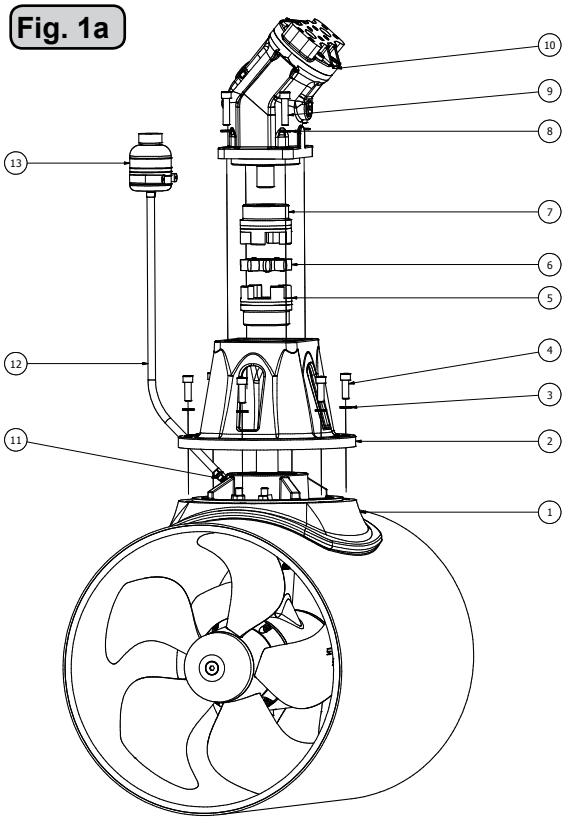


Fig. 1b

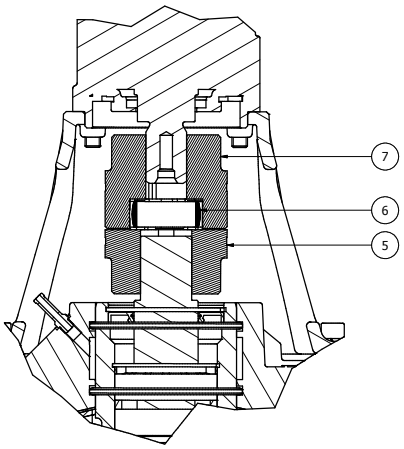
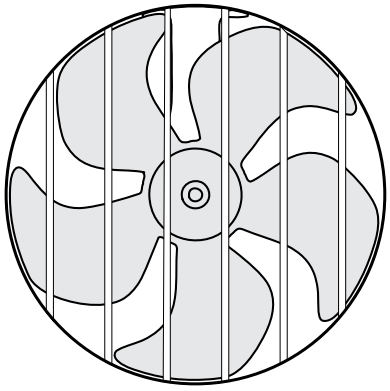


Fig. 2



1: Lower bracket
2: Upper bracket
3: Lock washers, bracket (8 pcs)
4: Bolts, bracket (8 pcs)
5: Coupling, lower part
6: Coupling, spider
7: Coupling, upper part (with key way or splines according to motor type)
8: Lock washers, motor (4 pcs)
9: Bolts, motor (4 pcs)
10: Hydraulic motor
11: Oil feed nipple
12: Oil tube
13: Oil tank

EN Fitting the hydraulic motor and coupling

Refer to the illustrations Fig 1a & 1b

1. Insert the lower coupling hub (5) onto the key way of the gear housing drive shaft. Do not tighten at this stage.
2. Mount the upper bracket (2) to the lower bracket (1) with the 8 securing bolts (4) and lock washers (3).Torque load to 86 Nm.
3. Place the coupling rubber/hard plastic spider (6) onto the lower hub (5).
4. Insert the upper coupling hub(7) onto the motor(10) shaft and lightly tighten its set screw, ensuring it maintains its position but still can be moved on the shaft.
5. Place the hydraulic motor (10) onto the upper bracket (2) ensuring the coupling hubs and spider engage. This can be achieved by simply rotating the motor (10) around its vertical axis.
6. Gain access to the coupling assembly through a upper bracket (2) side opening. Adjust to centralize the flexible coupling assembly between the gear housing and hydraulic motor flange. Refer to illustration Fig 1b.
7. With the final position of the upper coupling hub(7) established, remove the motor (10) and torque load the upper coupling(7) set screw to; Key way hub - 25Nm, Splined hub SH1000 - 67Nm, splined hub SH1400 - 120 Nm.
8. Gain access through a side opening of the upper bracket(2) and lift the lower coupling hub(5) so it fits firmly against the coupling spider(6). NB. The flexible coupling must not be subject to a axial load.
9. Torque load lower coupling key way hub (5) set screws to 25 Nm.
10. Rotate the propellers by hand and check the flexible coupling assembly for complete range & freedom of movement.

In some cases (shallow installation or workboat / fishinENoat only) we recommend to protect the propeller by mounting a grid in the tunnel opening (Fig. 2). It is important to keep a grid to a minimum and as streamlined for the thrusters waterflow as possible, as it can decrease the effect of the thrusters up to 15%.

NB ! Paint the gearhouse and propeller with antifouling for propellers to prevent growth of barnacles or similar which would reduce the performance dramatically. Do not paint the propeller shaft, the anodes or the end face of the gearhouse.

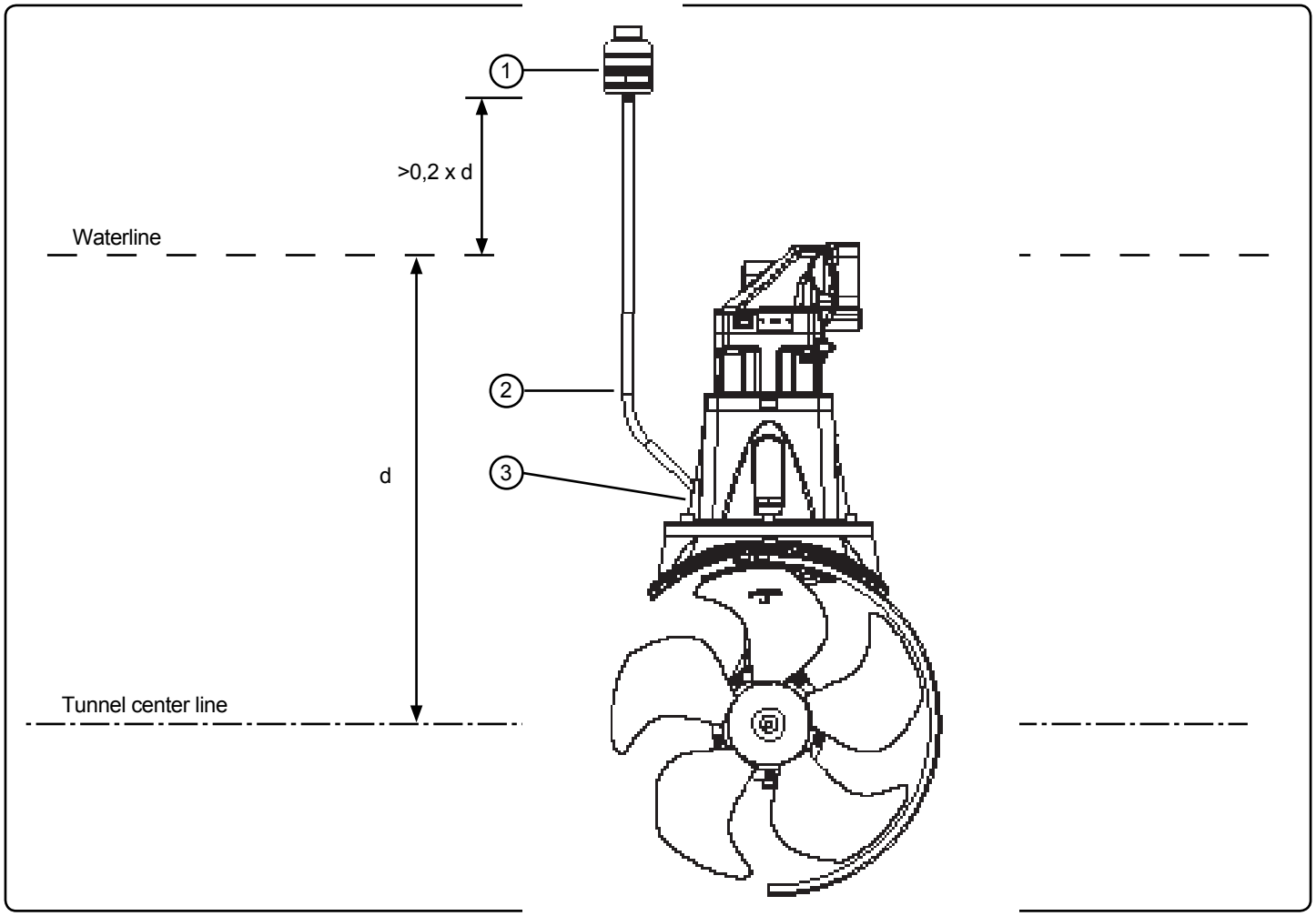
N Montering av hydraulikkmotor og kobling

Referer til illustrasjonene Fig 1a og 1b

1. Plasser nederste del av den fleksible koblingen (5) på kileporet på girhusakselen. Ikke stram til.
2. Monter øvre motorbrakett (2) til nedre del (1) med de 8 medfølgende bolter (4) og låseskiver(3). Trekk til med 86Nm
3. Plasser koblingens gummi/plastdel (6) på nederdelen(5)
4. Monter koblingens øvre del (7) på hydraulikkmotorens (10) aksel og stram festeskruen lett slik at den ikke faller av, men fremdeles kan beveges.
5. Plasser hydraulikkmotoren (10) på den øvre braketten (2). Kontroller at koblingens deler går i inngrep. Dette gjøres enklest ved å dreie motoren om dens vertikale akse.
6. Sentrer koblingens deler mellom girhuset og motorens flens i henhold til Fig. 1b
7. Når koblingen er sentrert, fjern motoren (10) og stram settskruen på koblingens øvre del med følgende moment: Nav med kilespor - 67Nm, Nav med splines, SH1000 - 67Nm, Nav med splines, SH1400 - 120Nm
8. Løft den nederste delen av koblingen slik at den ligger tett opptil plast/gummidelen (6). NB: Koblingen må ikke utsettes for aksiell last.
9. Stram til settskruene på koblingens nedre del (5) med 25Nm
10. Roter propellene for hånd for å sjekke at koblingen roterer fritt

I visse tilfeller (ved grunne installasjoner, fiske / arbeidsfartøy) anbefaler vi å beskytte propell og girhus ved å montere et gitter foran tunnelåpningene (Fig. 2). Det er da meget viktig å beholde strømlinjeformen, og å begrense gitteret til et minimum. Feil installasjon kan begrense skyvekraften med 15%

NB ! Påfør bunnstoff på girhus og propell for å unngå vekst som kan virke sterkt hemmende på thrusterens effekt. Anoder, propellaksling og tetninger skal ikke stoffes.



EN Fitting oil tank

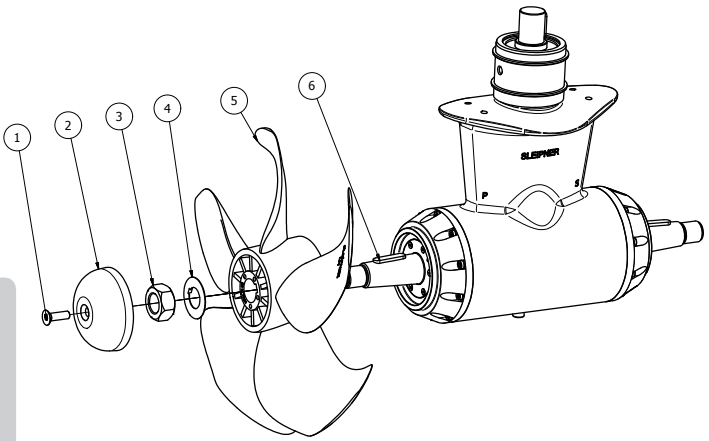
1. Fit the oil tank (1) above the waterline by at least 20% of the distance from the waterline to the centre of the tunnel. This is for ensuring enough overpressure of oil in the gearhouse.
2. Fit the oil tube (2) to the tank (1) and the feed nipple (3) in the motor bracket. Tighten the two tube clamp screws. Make sure that the oil tube has no loops that makes an airlock to stop the oil flow and has a good angle to allow the oil to flow freely into the gearhouse.
3. Fill the oil tank with gear oil type GL-5 similar to the oil used in the gear leg. The oiltank is a checkpoint to ensure that there is oil in the gear leg at all times.

.

N Montering av oljebeholder

1. Plasser oljebeholderen (1) over vannlinjen, minst 20% av avstanden fra vannlinjen til senter av tunnellen. Dette sørger for tilstrekkelig overtrykk i girhuset.
2. Monter oljeslangen (2) mellom beholderen (1) og nippelen (3) på motorbraketten. Stram de to slangeklemmene. Kontroller at ikke slangen er i klem eller har sløyfer som kan lage luftlåser som hindrer oljestrømmen. Pass på at slangen er ført slik at den gir fri flyt til girhuset.
3. Fyll oljebeholderen med girolje av typen GL-5, samme som benyttet i girhuset. Oljetanken er en indikator for å forsikre seg om at det er olje i girhuset til enhver tid.

❶ Hydraulic motor
❷ Mounting plate
❸ Motor bracket for holding motor and gear leg together on the tunnel.
❹ Flexible coupling secures the motor if propeller is jammed. Changeable from inside the boat.
❺ Bronze Q-propeller for ultimate performance.
❻ Oil-filled gearleg.
❼ Changeable anode protects gear leg from corrosion in seawater.



❶ Oil drain screw with washer
❷ Keys
❸ Washer
❹ Propeller lock nut
❺ Zinc anode
❻ Screw for zinc anode

EN Maintenance

- There must always be oil in the oil reservoir. Refill if necessary with gear oil GL-5.
- Drain oil after first 50 hour of runtime, then with 500 hours runtime intervals. Refill with GL-5 gear oil if needed
- Change the gear oil a minimum of every second year. Check the gearoil quality in the gearhouse every time the boat is out of the water.
- Retighten the bolts holding the gearhouse to the motorbracket during the first on-land service with the specified bolt tightening force (see page 13).
- Keep the propeller and gearhouse clean from growth by painting with antifouling before every season.
  PS ! The anode, sealing and propeller shafts must absolutely not be painted. Be careful that you don't fill paint in the "tracks" in the gearhouse that the propeller hub moves in.
- Change the anode before every season, or when about half the anode is gone. Always use a sealant on the screw holding the zincanode to ensure that it does not fall off. Please observe that in some waterconditions it can be necessary to install an extra anode to ensure that it lasts for the whole period between regular service lifts of the boat. Consult your dealer for information on how to do this.
- As a part of the seasonal service of your boat, and before every season, always check that:
  - The propeller is securely fastened
  - The bolts holding the motor to the motorbracket are fastened correctly.
  - The area where the thruster is installed is clean and dry. If there are signs of water you must try to find the source and eliminate it.

N Vedlikehold

- Det må alltid være olje i oljebeholderen. Etterfyll om nødvendig med girolje av typen GL-5
- Drain oil after first 50 hour of runtime, then with 500 hours runtime intervals. Refill with GL-5 gear oil if needed
- Bytt girolje minst hvert annet år. Sjekk oljenivået i girhuset hver gang båten er på land.
- Etterstram boltene som fester girhuset til motorbraketten ved første service på land. Korrekt tiltrekkingsmoment er oppgitt på side 13.
- Sørg for å unngå vekst på propell og girhus ved å påføre bunnstoff før hver sesong.
  PS ! Anoder, tetninger og propeller må ikke påføres bunnstoff. Sørg for å ikke tette åpningen mellom girhus og propellnav med bunnstoff
- Skift anoder før hver sesong, eller når omtrent halve anoden er borte. Bruk alltid gjengelim på festekruen for å unngå at skruen løsner på grunn av rotasjonen. Vær oppmerksom at enkelte forhold kan gjøre det nødvendig med en ekstra anode for å opprettholde beskyttelsen gjennom hele sesongen.
- Som en del av det periodiske vedlikeholdet av din båt, og før hver sesong må følgende ting sjekkes:
  - Propellen sitter godt festet
  - Boltene som holder motoren til braketten er korrekt tiltrukket
  - Skottet der trusteren er montert skal være rent, og tørt. Hvis det er vann i skottet må lekkasjen finnes og tettes.

EN Checklist (only for thruster)

- ☐ Propeller is fastened correctly to the shaft.
- ☐ Propeller turns freely in tunnel.
- ☐ Lower-unit is filled with gearoil.
- ☐ Oil-drain screw is tightened and the copper seal is present.
- ☐ The anode holding screw is tightened well with thread glue.
- ☐ Anti-fouling have been applied to the gearhouse and propeller but NOT on the zincanode or the gearhouse lid where the propeller is fastened.
- ☐ Oil tank is fitted above the waterline as required and filled with gearoil.
- ☐ Correct drive direction as per controlpanel.
- ☐ The bolts holding the gearhouse and motorbracket together are tightened correctly.
- ☐ The bolts holding the hydraulic motor to its bracket are tightened correctly.

The thruster has been installed as per the instructions in this manual and all points in checklist above have been controlled.

Signed: .....

Date: .....

Extra pre-delivery tests by installer / yard who does not use other quality control systems !

Thruster type: ....

Serial number:.....

Date of delivery:.....

Correct drive direction as per controlpanel: .....

The compartment for the thruster has been isolated from general bilge water and has no obvious or suspected risks for flooding:

.....

.....

.....

Other comments by installer: .....

.....

.....

.....

N Sjekkliste (Kun truster)

- ☐ Propellen er festet til akselen på korrekt vis.
- ☐ Propellen roterer fritt i tunnel.
- ☐ Girhuset er fylt med korrekt olje.
- ☐ Oljedrenerings skruen er korrekt strammet og utstyrt med kobberpakning
- ☐ Festeskruen for anodene er strammet og sikret med gjengelim
- ☐ Bunnstoff er påført girhus og propell, men ikke på sinkanode, tetninger eller propellaksel.
- ☐ Oljetanken er plassert over vannlinjen som spesifisert og fylt med girolje
- ☐ Kontrollpanel gir korrekt kjøreretning på thrusteren.
- ☐ Boltene som festet braket til girhus er festet korrekt.
- ☐ Boltene som festet motor til braket er festet korrekt.

Thrusteren er installert i henhold til instuksene gitt i denne manualen, og alle punkter i sjekklisten er kontrollert.

Signatur: .....

Dato: .....

Anbefalt før leverings test for installør / verft som ikke bruker andre kvalitetskontrollsystemer!

Truster type: ....

Serienummer:.....

Leveringsdato:.....

Korrekt kjøreretning per kontrollpanel: .....

Skottet hvor thrusteren er montert er isolert fra kjølvann og har ingen åpenbar risiko for lekkasje:

.....

.....

.....

Kommentar fra installør:: .....

.....

.....

.....

EN Important user precautions

- Always turn the control device off when the thruster is not in use.
- Never use a thruster close to somebody in the water, as the thruster will draw objects close by into the tunnel and contact with the rotating propellers will cause serious injuries.
- When leaving the boat always turn off the main power switch for the thruster.
- If the thruster is not performing or functioning as usual, the cause for this must be found and corrected as soon as possible so to avoid causing any other or further damage to the equipment.

N Viktige brukerforebehold

- Skru alltid av kontrollpanelet etter bruk.
- Bruk aldri thrusteren når noen er i vannet, thrusteren vil trekke gjenstander til seg og kontakt med propellen vil volde alvorlig skade.
- Når man forlater båten skal alltid hovedstrømsbryteren slås av.
- Hvis thrusteren ikke fungerer tilfredsstillende må feilen lokaliseres og rettes så snart som mulig for at ikke thrusteren skal ta ytterligere skade.

EN How to use Sidepower thrusters

1 Turn main power switch for the bowthruster on / make sure that the hydraulic pump is running.

2 Engage the On/Off switch for the bowthruster on the boats main panel or close to the bowthruster control.

3 Turn the bow in the desired direction by moving the joystick - pushing the button or the footswitch in the direction you want to move the bow.
Always test drive the direction in open water, never run the thruster on land.

4 Depending on the sideways speed of the bow, you must disengage the control device shortly before the bow is in the desired direction, as the boat will continue to move after stopping the bowthruster.

5 Please take some time to exercise this in open water to avoid damages to your boat.

ALWAYS USE WITH CARE AND NEVER WHEN THERE IS ANY DANGER FOR PEOPLE BEING IN THE VICINITY OF THE THRUSTER.

MAKE SURE THAT THE POWER SOURCE FOR THE HYDRAULIC PUMP IS TURNED COMPLETELY OFF BEFORE TOUCHING ANY PART OF THE THRUSTER, INSIDE OR OUTSIDE THE BOAT.

N Hvordan bruke Side-Power trustere

1 Skru på hovedbryeren og sjekk at den hydrauliske pumpen fungerer

2 Slå på ON/OFF-bryteren på trusterens kontrollpanel

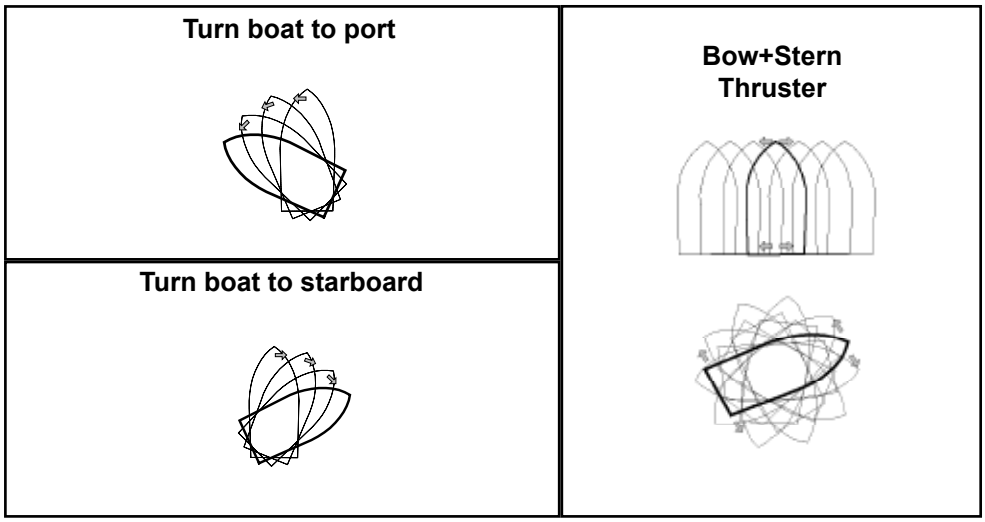
3 Kjør baugen i samme ønsket retning som du beveger joysticken. Andre kontrollenheter som fotbrytere osv. kan også brukes. Prøv alltid kjøreretningen med båten på vannet, thrusteren må ikke kjøres når båten ligger på land.

4 Avhengig av hvor stor fart baugen får sideveis må trusteren stoppes før baugen er i riktig posisjon, dette fordi baugen vil fortsette sideveis litt etter trusteren skrues av.

5 Det er fordel om baugtrusteren prøves på åpent vann den første gangen.

UTVIS FORSIKTIGHET OG BRUK ALDRI TRUSTEREN HVIS DET ER SJANSE FOR MENNESKER I NÆRHETEN AV TRUSTEREN.

SØRG FOR AT KRAFTKILDEN TIL DEN HYDRAULISKE PUMPEN ER SLÅTT AV FØR BERØRING AV TRUSTEREN



EN

Warranty statement

1. The equipment manufactured by Sleipner Motor AS (The “Warrantor”) is warranted to be free from defects in workmanship and materials under normal use and service.
2. This Warranty is in effect for of two years from the date of purchase by the user. Proof of purchase must be included, to establish that it is inside the warranty period.
3. This Warranty is transferrable and covers the product for the specified time period.
4. In case any part of the equipment proves to be defective, other than those parts excluded in paragraph 5 below, the owner should do the following:
(a) prepare a detailed written statement of the nature and circumstances of the defect, to the best of the Owner's knowledge, including the date of purchase, the place of purchase, the name and address of the installer, and the Purchaser’s name, adress and telephone number;
(b) the Owner should return the defective part or unit along with the statement referenced in the preceding paragraph to the warrantor, Sleipner Motor AS or an authorized Service Centre, postage/shipping prepaid and at the expense of the Purchaser;
(c) if upon the Warrantor’s or Authorized Service Centre’s examination, the defect is determined to result from defective material or workmanship, the equipment will be repaired or replaced at the Warrantor’s option without charge, and returned to the Purchaser at the Warrantor’s expense;
(d) no refund of the purchase price will be granted to the Purchaser, unless the Warrantor is unable to remedy the defect after having a reasonable number of opportunities to do so. Prior to refund of the purchase price, Purchaser must submit a statement in writing from a professional boating equipment supplier that the installation instructions of the Installation and Operation Manual have been complied with and that the defect remains;
(e) warranty service shall be performed only by the Warrantor, or an authorized Service Centre, and any attempt to remedy the defect by anyone else shall render this warranty void.
5. There shall be no warranty for defects or damages caused by faulty installation or hook-up, abuse or misuse of the equipment including exposure to excessive heat, salt or fresh water spray, or water immersion except for equipment specifically designed as waterproof.
6. No other express warranty is hereby given and there are no warranties which extend beyond those described in section 4 above. This Warranty is expressly in lieu of any other expressed or implied warranties, including any implied warranty of merchantability, fitness for the ordinary purposes for which such goods are used, or fitness for a particular purpose, and any other obligations on the part of the Warrantor or its employees and representatives.
7. There shall be no responsibility or liability whatsoever on the part of the Warrantor or its employees and representatives for injury to any person or persons, or damage to property, loss of income or profit, or any other consequential or resulting damage or cost which may be claimed to have been incurred through the use or sale of the equipment, including any possible failure or malfunction of the equipment, or part thereof.
8. The Warrantor assumes no liability for incidental or consequential damages of any kind including damages arising from collision with other vessels or objects.
9. This warranty gives you specific legal rights, and you may also have other rights which vary from country to country.

N

Worldwide sales and service

www.side-power.com

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